CARDIAC SIMULATION 6

Simulation focus - PEA following sepsis (BLS Infant – skill)

Expected outcomes

Team Leader - Perform initial ABCDE assessment, direct team and lead care – taking over skills as and when appropriate. Identify the infant is in PEA, initiate BLS and appropriate initial therapies (adrenaline and identify/treat reversible causes – specifically sepsis). Identify need for and summon cardiac arrest team.

Team/More experienced candidate - Identify ongoing need for treatment after ROSC including inotropic support. Discuss with team or in the de-brief. (If no candidate familiar with this issue, then management to be undertaken as group discussion in the debrief).

Assessment

This simulation allows for practise and assessment of infant BLS.

History

Emergency staff

Pre-alert from the paramedics:
Ibrahim is a 9-month-old boy who is being brought in with 48 hours of fever and reduced consciousness.

Ward staff

Ibrahim is a 9-month-old boy who was admitted to hospital for observation after presenting with 48 hours of fever and generally unwell. He has had bloods sent but they are not back. He does not have any IV access. His mother says he is not responding to her.

Immediately apparent

Please ensure the prompt card with global overview is placed on the manikin for the start of the sim.

The infant looks pale, grey and cyanosed. They appear lifeless.

Clinical course *(to be given as the simulation progresses)*

Assess	Features	Action	Key treatment points
Basic Life Support phase			
A	No response to stimuli **Apnoeic** (**U** on AVP**U**)	Assess, airway opening manoeuvres, gives oxygen	**Asks for help/arrest team (ED)** **Open airway**
B	**Apnoeic**, no sats trace or respiratory effort	Assess – look, listen, feel (and signs of life check)	**Recognises arrest and ensures 2222 call put out** **5 rescue breaths via BMV**
C	***No pulse palpable*** Pale, grey, cyanosed and has cool peripheries.	Starts CPR	**Commences CPR in 15:2 ratio**
Advanced Life Support – 1st cycle, nurse arrives with arrest trolley and help			
Assess rhythm	**PEA** – **HR 60** once defib pads applied	Apply defib pads	**Recognises non-shockable path of algorithm**
Basic life support	**No signs of life**	Ongoing CPR in 15:2 ratio Advanced airways may be considered	**Ensures ongoing adequate CPR and ventilation.**

		The leader should move away from performing interventions and delegate as appropriate	
Delivers drugs	No IV access	Obtains access Takes gas and bloods	**Obtains IV/IO access** **Ensures adrenaline administered** 1ml 1:10000 Administers fluid bolus
Checks 4 Hs and 4 Ts			
Advanced Life Support – 2nd cycle			
Assess rhythm	**PEA** – **HR 60** **no pulse** on check		**Recognises non-shockable path of algorithm**
Basic life support	**No signs of life**	Ongoing CPR in 15:2 ratio Advanced airways may be considered	**Ensures ongoing adequate CPR and ventilation.**
Delivers drugs	Single IV/IO access	Considers further access	Administers fluid bolus
Checks 4 Hs and 4 Ts			
Advanced Life Support – 3rd cycle			
Assess rhythm	**PEA** – **HR 60** **no pulse** on check		**Recognises non-shockable path of algorithm**
Basic life support	**No signs of life**	Ongoing CPR in 15:2 ratio Advanced airways may be considered	**Ensures ongoing adequate CPR and ventilation.**
Delivers drugs	IV access		**Ensures adrenaline administered** 1ml 1:10000 Administers fluid bolus
Checks 4 Hs and 4 Ts			
Providing at least one fluid bolus has been given, at the next pulse check the patient will have a sinus rhythm HR of 170 with a pulse present on palpation. This should prompt re-assessment			

Reassessment

Requires 3 cycles of CPR to gain ROSC. Poor blood pressure requiring further fluid resuscitation. Needs inotropic support to maintain circulation. Requires intubation and ventilation.

Candidates should work their way down the list of reversible causes of arrest	
Hyperkalaemia/Hypoglycaemia etc	Gas requested: K 5.1, Na 129, Ca 1.01 Glucose 4.5
Hypoxia	Ensures adequacy of ventilation on high flow oxygen
Hypothermia	**Temp 39.8** on presentation, falling if rechecked as arrest goes on
Hypovolaemia	**Must give at least one fluid bolus prior to ROSC**
Tamponade Thrombus Toxins	No history suggestive of these
Tension pneumothorax	Good bilateral air entry

Assess	Features	Action	Key treatment points
A	Requires ongoing airway support	Assess Consider oral airway initially, moving on to intubation if not I&V during arrest	**Airway adjuncts acceptable initially** but needs ETT
B	**Apnoeic** requiring ventilation. **On ROSC**, has poor trace and difficult to get saturations until at least 20 ml/kg given, then **SpO_2 90%** in 100% O_2	Assess including auscultation and SpO_2	**High flow oxygen, ventilate via BMV**
C	Pulse present but weak, **HR 170, CRT 5, BP 52/27**	Takes bloods and blood cultures if not already performed. May repeat gas	**IV fluid bolus** Recognises possible need for inotropic support if not fluid responsive
D	**U** on AVP**U**, **BM 2.4** Pupils size 3	Assess Blood sugar	**Request senior/PICU review** **IV glucose bolus 3 ml/kg**
E	**Temp 38.1**	Antibiotics	**IV antibiotics**

NB	• **Discussion about fluid support and post ROSC care** • **Discussion on sepsis management**

Debrief

Using the learning conversation, discuss the technical and non-technical elements of the simulation

Assessment

This station makes up part of the continuous assessment process, therefore candidates need to know whether they are meeting the standard.

At the end give the opportunity for candidates to ask questions, answer these and then summarise the key points.

Props to print and laminate

Cardiac 6 - Global overview (to be placed on SIM manikin)

The infant looks pale, grey and cyanosed.

They appear lifeless.

Cardiac 6 - Results Information:

Venous Blood Gas – during arrest

pH	7.09
PO_2	6.3
pCO_2	7.9
HCO_3-	11
BE	-12
Na	129
K	5.1
Ca (ionised)	1.01
Lactate	5.7

BM 4.5 (BM 2.4 post ROSC)

Faculty helper information – Cardiac 6

When candidate requests information regarding observations please give the following in "real-time" (e.g., wait for blood pressure to cycle, saturation trace to be achieved). If key treatment points are not undertaken, consider a "prompt" that would be visible in a child.

Assess	Observation	Example prompt
A	**Apnoeic** (**U** on AVP**U**)	"Do you need any help?"
B	**Apnoeic**, no sats trace or respiratory effort	If doesn't open airway and look, listen feel then prompt that child looks pale and lifeless. "do you want us to start BLS?"
C	**No pulse palpable** Pale, grey, cyanosed and has cool peripheries.	"do you want the crash trolley/crash call?" "do you want us to start BLS?" "do you need the algorithm?" "shall we check his pulse?"

Assess	Observation	Example prompt
Assess rhythm	PEA – 60 once pads applied	If they ask you to defibrillate, "I don't think it's shockable?" If mistaken for Sinus Rhythm – "but there wasn't a pulse?"
Basic life support	No signs of life	"do you need the algorithm?"
Delivers drugs	No IV access	"we don't have any access" If asked to give adrenaline prior to securing. "are there any drugs you need?"
"are there any tests you want?" if not asked for a gas "should we think about reversible causes" if no fluid given "he was very hot when he came in"		

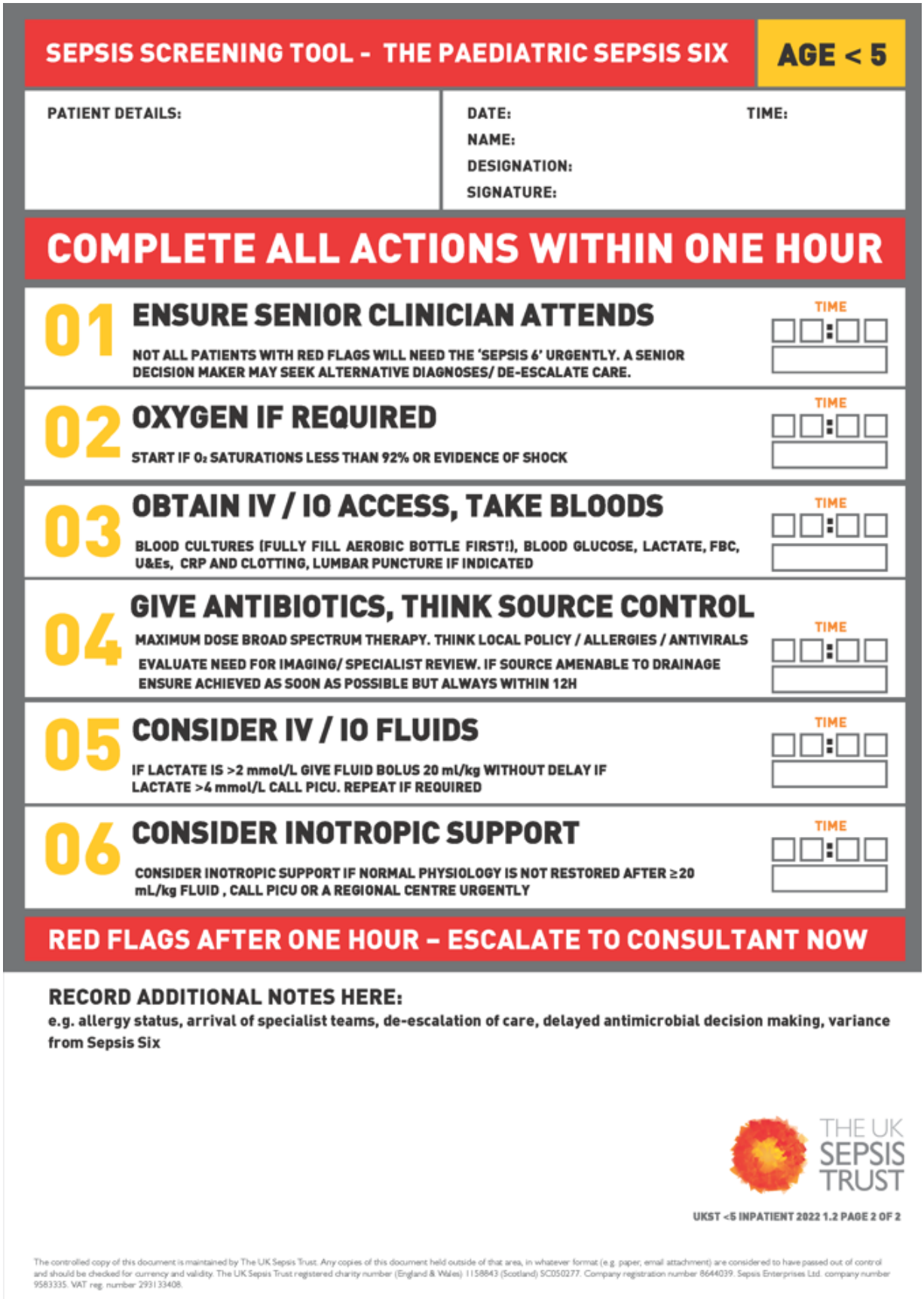
Candidates should work their way down the list of reversible causes of arrest	
Hyperkalaemia/Hypoglycaemia etc	Gas requested: K 5.1, Na 129, Ca 1.01 Glucose 4.5
Hypoxia	Ensures adequacy of ventilation on high flow oxygen
Hypothermia	**Temp 39.8** on presentation, falling if rechecked later
Hypovolaemia	**Must give at least one fluid bolus prior to ROSC**
Tamponade Thrombus Toxins	No history suggestive of these
Tension pneumothorax	Good bilateral air entry

Reassessment

Assess	Observation	Example prompt
A	Requires ongoing airway support	"Do you think you want any more support for the air-way?"
B	**Apnoeic** requiring ventilation. **On ROSC**, has poor trace and difficult to get saturations until at least 20 ml/kg given, then **SpO_2 90%** in 100% O_2	"It's not a very good trace" "It doesn't look like he's breathing for himself" if not being ventilated post ROSC
C	Pulse present but weak, **HR 170, CRT 5, BP 52/27**	"Do you want to continue with CPR?" If ask for bloods prompt "which ones" If tachycardia and hypotension not noted post ROSC, prompt with observations and "Do you want anything else?" "do you want any drugs preparing or fluids"
D	**U** on AVP**U**, **BM 2.4** Pupils size 3	"Do you want me to recheck his sugar" "Do you want any treatment for that?"
E	**Temp 38.1**	If antibiotics not given, "I wonder why he arrested?" "have you seen his temperature"

Algorithms:

Asystole and pulseless electrical activity algorithm
Sepsis pathway



SEPSIS SCREENING TOOL - THE PAEDIATRIC SEPSIS SIX

AGE < 5

PATIENT DETAILS:

DATE: TIME:
NAME:
DESIGNATION:
SIGNATURE:

COMPLETE ALL ACTIONS WITHIN ONE HOUR

01 ENSURE SENIOR CLINICIAN ATTENDS
NOT ALL PATIENTS WITH RED FLAGS WILL NEED THE 'SEPSIS 6' URGENTLY. A SENIOR DECISION MAKER MAY SEEK ALTERNATIVE DIAGNOSES/ DE-ESCALATE CARE.
TIME

02 OXYGEN IF REQUIRED
START IF O_2 SATURATIONS LESS THAN 92% OR EVIDENCE OF SHOCK
TIME

03 OBTAIN IV / IO ACCESS, TAKE BLOODS
BLOOD CULTURES (FULLY FILL AEROBIC BOTTLE FIRST!), BLOOD GLUCOSE, LACTATE, FBC, U&Es, CRP AND CLOTTING, LUMBAR PUNCTURE IF INDICATED
TIME

04 GIVE ANTIBIOTICS, THINK SOURCE CONTROL
MAXIMUM DOSE BROAD SPECTRUM THERAPY. THINK LOCAL POLICY / ALLERGIES / ANTIVIRALS
EVALUATE NEED FOR IMAGING/ SPECIALIST REVIEW. IF SOURCE AMENABLE TO DRAINAGE ENSURE ACHIEVED AS SOON AS POSSIBLE BUT ALWAYS WITHIN 12H
TIME

05 CONSIDER IV / IO FLUIDS
IF LACTATE IS >2 mmol/L GIVE FLUID BOLUS 20 ml/kg WITHOUT DELAY IF LACTATE >4 mmol/L CALL PICU. REPEAT IF REQUIRED
TIME

06 CONSIDER INOTROPIC SUPPORT
CONSIDER INOTROPIC SUPPORT IF NORMAL PHYSIOLOGY IS NOT RESTORED AFTER ≥20 mL/kg FLUID , CALL PICU OR A REGIONAL CENTRE URGENTLY
TIME

RED FLAGS AFTER ONE HOUR – ESCALATE TO CONSULTANT NOW

RECORD ADDITIONAL NOTES HERE:
e.g. allergy status, arrival of specialist teams, de-escalation of care, delayed antimicrobial decision making, variance from Sepsis Six

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